AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method for detecting a position of a mobile robot, comprising:

receiving an infrared signal ~~and a~~ and ultrasonic ~~signal~~ signals; ~~and~~

calculating a time difference between the received infrared signal and the ultrasonic ~~signal;~~signals; and

detecting a position of a mobile robot on the basis of the calculated time difference and a distance value previously stored between ultrasonic wave generators generating the ultrasonic signals,

wherein in the step of calculating the time difference, respective times at which the ultrasonic signals have been received are measured on the basis of the time at which the infrared signal has been received.

2. (Canceled)

3. (Original) The method of claim 1, wherein the step of detecting a position of the mobile robot comprises:

calculating a distance between the ultrasonic wave generators and the mobile robot by multiplying a sound velocity to the calculated time difference value; and

detecting the distance and angle between the ultrasonic wave generators and the mobile robot on the basis of the calculated distance and the distance value previously stored between the ultrasonic wave generators.

4. (Original) The method of claim 1, wherein, in the step of detecting a position of the mobile robot, the distance and angle of the mobile robot are detected through a triangulation on the basis of the calculated distance value and the distance value previously stored between the ultrasonic wave generators.

5. (Original) The method of claim 1, wherein the ultrasonic signals have different frequencies.

6. (Currently Amended) A method for detecting a position of a mobile robot, comprising:

transmitting an infrared signal generated from a fixed infrared generator ~~and a~~and ultrasonic ~~signal~~ signals generated ~~from a~~from fixed ultrasonic wave ~~generator,~~generators, to a mobile robot;

calculating a time difference between the transmitted infrared signal and the ultrasonic ~~signal;~~ signals;

calculating each distance between the mobile robot and the ultrasonic wave generators on the basis of the calculated time difference value; and

detecting a position of the mobile robot on the basis of the calculated distance value and a distance value previously set between the ultrasonic wave generators,

wherein in the step of calculating the time difference, the time at which the ultrasonic signals have been received is measured on the basis of the time at which the infrared signal has been received.

7. (Canceled)

8. (Original) The method of claim 6, wherein the distance between the mobile robot and the ultrasonic wave generators is calculated by multiplying a sound velocity to the calculated time difference value.

9. (Original) The method of claim 6, wherein, in the step of detecting a position of the mobile robot, a distance and an angle between the ultrasonic wave generators and the mobile

robot are detected on the basis of the calculated distance value and the distance value previously set between the ultrasonic wave generators.

10. (Original) The method of claim 6, wherein, in the step of detecting a position of the mobile robot, a distance and an angle between the ultrasonic wave generators and the mobile robot are detected through a triangulation on the basis of the calculated distance value and the distance value previously set between the ultrasonic wave generators.

11. (Original) The method of claim 6, wherein the ultrasonic signals have different frequencies.

12. (Currently Amended) A method for detecting a position of a mobile robot in which a position of a mobile robot is detected by calculating a distance between the mobile robot and a charging device, comprising:

receiving an infrared signal and a first ultrasonic signal simultaneously generated from an infrared generator and a first ultrasonic wave generator, respectively, installed at the charging device;

calculating a distance between the mobile robot and the first ultrasonic wave generator on the basis of the infrared signal and the first ultrasonic signal;

receiving a second ultrasonic signal generated from a second ultrasonic wave generator installed at the charging device;

calculating a distance between the mobile robot and the second ultrasonic wave generator on the basis of the second ultrasonic signal; and

detecting a position of the mobile robot on the basis of a previously set distance value between the first ultrasonic wave generator and the second ultrasonic wave generator, a distance value between the first ultrasonic wave generator and the mobile robot, and the distance value between the second ultrasonic wave generator and the mobile robot.

13. (Original) The method of claim 12, wherein the step of calculating a distance between the mobile robot and the first ultrasonic wave generator comprises:

measuring a time at which the first ultrasonic signal has been received on the basis of the time at which the infrared signal has been received; and

multiplying a sound velocity to the measured time.

14. (Original) The method of claim 12, wherein the second ultrasonic signal is oscillated when the predetermined time elapses.

15. (Original) The method of claim 14, wherein the step of calculating the distance between the mobile robot and the second ultrasonic wave generator comprises:

measuring a time at which the second ultrasonic signal has been received on the basis of the time at which the infrared signal has been received; and

subtracting the predetermined time from the time at which the second ultrasonic signal has been received.

16. (Original) The method of claim 12, wherein the first and second ultrasonic signals have difference frequencies.

17. (Currently Amended) An apparatus for detecting a position of a mobile robot, wherein an infrared signal ~~and a~~and ultrasonic ~~signal~~signals are received, a time difference between the received infrared signal and the ultrasonic ~~signal,~~signals, and a position of a mobile robot is detected on the basis of the calculated time difference value and a distance value between ultrasonic wave generators generating the ultrasonic signals,

wherein the apparatus comprises means for measuring a time at which the ultrasonic signals have been received on the basis of the time at which the infrared signal has been received.

18. (Canceled)

19. (Currently Amended) The apparatus of ~~claim 17~~claim 17, further comprising:

~~a means~~means for calculating a distance between the ultrasonic wave generators and the mobile robot by multiplying a sound velocity to the calculated time difference value; and

~~a means~~means for detecting a distance and an angle between the ultrasonic wave generators and the mobile robot on the basis of the calculated distance value and the distance value previously stored between the ultrasonic wave generators.

20. (Currently Amended) The apparatus of ~~claim 17~~claim 17, further comprising:

~~a means~~means for detecting a distance and angle between the ultrasonic wave generators and the mobile robot through triangulation on the basis of the calculated distance value and the distance value previously stored between the ultrasonic wave generators.

21. (Original) The apparatus of claim 17, wherein the ultrasonic signals have difference frequencies.

22. (Original) An apparatus for detecting a position of a mobile robot in which a position of a mobile robot is detected by calculating a distance between the mobile robot and a charging device, comprising:

an infrared signal generator installed at the charging device and generating an infrared signal;

a first ultrasonic wave oscillator installed at the charging device and oscillating a first ultrasonic signal simultaneously together with the infrared signal;

a second ultrasonic wave oscillator installed at the charging device and oscillating a second ultrasonic signal after the first ultrasonic signal is generated; and

a position detector for calculating a time difference between the first and second ultrasonic signals on the basis of time when the infrared signal has been received, calculating a

distance between the mobile robot and the first and second ultrasonic wave generators on the basis of the calculated time difference, and detecting a position of the mobile robot on the basis of the calculated distance value and a pre-set distance value between the first and second ultrasonic wave oscillators.

23. (Original) The apparatus of claim 22, wherein the position detector comprises:

a first measuring unit for receiving the infrared signal and the first ultrasonic wave signal and measuring a time at which the first ultrasonic signal has been received on the basis of the time at which the infrared signal has been received;

a first distance calculator for calculating a distance between the mobile robot and the first ultrasonic wave oscillator on the basis of the measured time by the first measuring unit;

a second measuring unit for measuring time at which the second ultrasonic signal has been received on the basis of a point when the infrared signal has been received;

a second distance calculator for calculating a distance between the mobile robot and the second ultrasonic oscillator on the basis of the time measured by the second measuring unit; and

a distance and angle calculator for detecting a distance and an angle between the mobile robot and the charging unit on the basis of the distance value between the first ultrasonic wave generator and the second ultrasonic wave generator, the distance value between the first ultrasonic wave generator and the mobile robot, and the distance value between the second ultrasonic wave generator and the mobile robot.

24. (Original) The apparatus of claim 22, wherein the charging unit further includes a plurality of ultrasonic wave generators.

25. (Original) The apparatus of claim 22, wherein the first and second ultrasonic signals have different frequencies.

26. (Original) The apparatus of claim 22, wherein the second ultrasonic wave oscillator oscillates the second ultrasonic wave when a predetermined time elapses after the first ultrasonic wave is oscillated from the first ultrasonic wave oscillator.